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SURVEY

OF

BOTTLED WATER SOLD IN MASSACHUSETTS

GOVERNMENT DOCUMENTS
COLLECTION
MAY 19 1988
University of Massachusetts
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Massachusetts Department of Public Health
Division of Food and Drugs

TABLE OF CONTENTS

PAGE

I. INTRODUCTION.. 1

II. MATERIALS 1

III. METHODS.. 2

IV. RESULTS.. 3

V. CONCLUSIONS AND RECOMMENDATIONS...................... 5

APPENDICES

A. List of In-state Bottled Water Companies

B. List of Out-of-State and Foreign Bottled Water

C. Priority Pollutants and Hazardous Substances Analyzed

D. Summary of Positive Results - Instate Samples

E. Summary of Positive Results - Out of State and Foreign Samples

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I. Introduction

A. In-state Survey.

At present there are 30 known water sources from which water is bottled in Massachusetts. These sources are distributed under fifty-three brand names with at least five brand names having more than one source. The survey was designed to include a sample from each water source in Massachusetts from which water is bottled and sold.

All bottled water samples were obtained by the Division of Food and Drug's Inspectional staff between October, 1986 and July, 1987 at the bottling site. Products that had test results above the allowable contaminant levels or guidelines specified by FDA and/or EPA were resampled.

Microbiological testing was performed by the Department of Public Health, State Laboratory Institute, radiologic testing by the Department of Public Health Radiation Control Laboratory and chemical testing by the Environmental Protection Agency, Region I Surveillance and Analytical Laboratory.

B. Out-of-State Survey.

Between May, 1987 and December, 1987, the Division of Food and Drugs conducted a similar survey on bottled water sold in Massachusetts originating from out-of-state and foreign sources. A market survey was performed initially to determine which brands were stocked in Massachusetts stores and thirty-four brand name bottled water products were identified and obtained by the Inspectional Staff at the retail level.

Microbiological and inorganic chemical testing was performed by the Department of Public Health, State Laboratory Institute, radiological testing by the Department of Public Health, Radiation Control Laboratory and volatile organic chemical testing by the Department of Environmental Quality Engineering, Lawrence Experiment Station.

II. Materials

Samples were tested for physical, microbiological, chemical (inorganic and organic), and radiological constituents. The following collection procedures and test methodologies were used:

A. Instate samples: all samples collected were commercial one gallon plastic or glass jug or five gallon plastic carboy containers which were freshly bottled. These samples were collected at the bottling sites and transported to the testing laboratories within two hours of collection, or refrigerated and transported within eight hours of collection.

The list of in-state bottled water companies, their plant location, source location and type (well, spring, municipal), and the brand names used by each bottler is included in Appendix A.

Initial samples from the in-state bottlers were collected between October, 1986 and April, 1987. Sixteen follow-up samples were collected from those sources that showed test results above the FDA/EPA maximum contaminant levels (MCL) or guideline levels during first round testing. The follow-up samples were collected for testing between March, 1987 and July 1987 and were analyzed only to confirm the initial elevated test results.

B. Out-of-state samples: all samples were collected at the retail level and transported to the testing laboratories shortly after collection or refrigerated and transported within twenty-four hours of collection. All samples of bottled water were collected between May, 1987 and November, 1987.

The bottled water products surveyed are listed by brand name, bottling company and the state or country of origin in Appendix B.

III. Methods

All samples were analyzed using the following methodologies:

A. Organoleptic: The water was examined for odor, color and clarity.

B. Microbiological: Total Coliform by membrane filtration method and Standard Plate Count by pour plate procedure using sample aliquots of 1.0 ml and 0.1 ml were used. Both methods are specified in Standard Methods for the Examination of Water and Wastewater, APHA, 15th edition.

C. Chemical:

1. The samples were examined for nitrate, flouride, sodium, copper, iron, manganese, arsenic and lead in accordance with "Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March, 1983," except that Method #418, Standard Methods for The Examination of Water and Waste Water, APHA, 15th edition, was used for the analysis of nitrate in the out-of-state samples.

2. The in-state samples were analyzed for priority pollutants and hazardous substances, as listed in Appendix C, using Method 624, Federal Register, Volume 49, #209, Oct.26, 1984.

   Volatile organic compounds in the out-of-state samples were analyzed using EPA Method 524, "Methods for Determining Organic Compounds in Finished Drinking Water and Raw Source Water", EPA, September, 1986.

D. Radiological: Gross alpha and gross beta were determined using Method 900.0, "Gross Alpha and Gross Beta Radioactivity in Drinking Water", as prescribed by the EPA, August 1980, EPA-600/4-80-032.

IV. Results

Results for specific analytes are listed if they were present in at least one sample. A summary of the results from the in-state samples is included in Appendix D. Results from foreign and out-of-state samples can be found in Appendix E. Highlights of the results include the following:

A. Organoleptic: Results showed that all samples were normal for organoleptic evaluations.

B. Microbiological:

1. Coliform:

   In-State: One sample was positive for coliforms, with a count of 1 coliform/100ml. The water source for this product is a town water supply. Upon resampling, the coliform level was <1 coliform/100ml.

2. Standard Plate Count:

   In-State: Standard plate counts were elevated above the guideline level of 500 colonies/ml in six samples. Upon resampling, all samples were below the guideline level.

   Out-Of-State: Standard plate count was elevated above the guideline level of 500 colonies/ml in one sample.

C. Chemical:

1. Arsenic:

   Out-Of-State: Arsenic was detected at over two times the MCL in a mineral water bottled in California.

2. Lead:

In-State: Lead was detected in one sample of distilled water at twice the MCL. The source of the water is a municipal supply and the water is distilled at the bottling site. Modifications were made at the plant and on second round testing the sample contained a lead level below the MCL.

Out-of-State: A lead level of 18ug/l was detected in one sample of sparkling water from New York.

3. Manganese:

In-State: Manganese was elevated above the secondary MCL in five samples. (The secondary MCL for manganese was set by EPA to minimize the objectionable qualities of manganese [brownish staining of laundry and bad taste in beverages] rather than to set a toxicity level.)

Out-Of-State: Manganese was detected at levels above the secondary MCL in three samples of mineral water bottled in Europe.

4. Sodium:

In-State: Sodium levels were elevated above the DEQE's Drinking Water guideline level of 20 mg/l in two samples, with levels of 24 and 40 mg/l detected.

Out-Of-State: Sodium levels were elevated above the DEQE guideline level of 20 mg/l in thirteen mineral water samples (out of a total of fourteen mineral waters tested).

5. Fluoride:

Out-Of-State: Fluoride levels two to four times the MCL were detected in three samples of mineral water.

6. Trihalomethanes (chloroform, bromodichloromethane, dibromochloromethane, and dibromomethane):

In-State: Trihalomethanes were elevated above the MCL of 100 micrograms/l in the first and second round sampling of water from one bottling site, with a chloroform level of 110 micrograms/l detected in both samples and 4 micrograms/l of bromodichloromethane detected in the sample collected in the first round of testing. The water source of this bottler is a municipal supply and the bottler uses a chlorination filtration system as part of the treatment of the water before it is bottled. The bottler replaced the filter and at third round testing, the chloroform level dropped below the MCL.

Eight water samples from other sources had detectable but within allowable limits of chloroform and two water samples showed detectable but within allowable limits of bromodichloromethane.

Out-Of-State: Although the trihalomethanes were not elevated above the MCL of 100 micrograms/l in any samples, detectable amounts were found in ten of the samples. Ten samples had detectable levels of chloroform, two had detectable levels of chloroform and bromodichloromethane, and one sample contained detectable amounts of chloroform, bromodichloromethane and dibromochloromethane.

7. Other Volatile Organics:

In-State: Toluene was detected in two samples. Butane was detected in one sample. Butane is found in many polyethylene containers such as those used for bottled water. It is harmless at the concentrations found and the level decreases with the continued reuse of the containers.

Out-Of-State: Methylene chloride, 1,1,1 trichloroethane, trichloroethylene, trichloro-trifluoroethane, ethanol, toluene, acetone, ethylbenzene, xylenes and several unidentified compounds were detected in varying amounts in fifteen samples.

D. Radiological: Gross alpha/beta activity:

In-State: Gross alpha activity above the MCL was detected in two samples, with one sample showing no detectable activity on second round testing. Although plant modifications were made, the other sample remained elevated through four rounds of testing. The bottler finally installed adequate equipment to reduce the level of alpha radioactivity (due to a natural uranium source) and at fifth round testing the levels of alpha activity fell within acceptable limits. Currently the bottler is allowed to bottle and sell the water, but the Division is closely monitoring the radioactivity levels.

Out-Of-State: Gross alpha activity above the MCL was detected in four samples and gross beta activity above the MCL was detected in one sample. All samples in which elevated radioactivity were detected were from foreign sources.

IV. Conclusions and Recommendations

The quality of bottled water sold in Massachusetts is generally acceptable, with a few exceptions, as detailed in section III. The results of this survey demonstrate the need for revised regulations that require bottlers to periodically test their water for specified inorganic, organic, microbiological and radiological parameters.

Appendix
A

WATER BOTTLERS
IN STATE BOTTLED WATER SURVEY 1986 87

BOTTLING COMPANY	LOCATION OF SOURCE	TYPE OF SOURCE	BRAND NAMES
FRANKLIN SPRINGS(GARELICK) FRANKLIN, MA	COTT WELL #1 MILLIS, MA	WELL	PARADISE SPRINGS, SHAWS, STAR MARKET, STOP & SHOP, WALDBAWN, SILVER SPRING, MOUNTAIN SPRING, EDWARDS, SWEET LIFE, MANHATTAN, IGA, PURITY SUPREME, A&P, SEUR-FINE, FRANKLIN SPRINGS, ANGELO'S, FINAST-1ST NATIONAL
MISCOE SPRINGS BEVERAGE COMPANY MENDON, MA	MENDON (AT PLANT)	SPRING	SILVER SPRINGS, MEOLA'S, IGA'S, REAL VALUE, STOP & SHOP
SIMPSON SPRINGS EASTON, MA	EASTON (AT PLANT	SPRING	SIMPSON SPRINGS WATER
OLD MILL POND SPRINGS WATER COMPANY RAYNAM, MA	RAYNAM (AT PLANT)	SPRING	OLD MILL POND
BLUE HILLS SPRINGS WATER COMPANY QUINCY, MA	WEST BROCKTON (ARTHUR STREET	SPRING	BLUE HILL SPRING WATER
CRYSTAL SPRINGS BEVERAGE COMPANY HAVERHILL, MA	HAVERHILL (AT PLANT)	WELL	CRYSTAL SPRING WATER, NORTH COUNTRY SPRING WATER, OLD KERRY DEEP ROCK SPRING WATER (BOTTLED BY CRYSTAL LAKE BOTTLING COMPANY, SAME LOCATION, SAME SOURCE)
HAWTHORNE BROOK SPRING WATER COMPANY SWAMPSCOTT, MA	SWAMSCOTT (AT PLANT)	WELL	HAWTHORNE BROOK SPRING WATER
BELMONT SPRINGS WATER COMPANY BELMONT, MA	BELMONT (AT PLANT)	SPRING	BELMONT SPRINGS (5 GAL
BELMONT SPRINGS WATER COMPANY BELMONT, MA	LYNN	MUNICIPAL	BELMONT SPRINGS DISTILLED WATER (1 AND 5 GAL
WEST LYNN CREAMERY LYNN, MA	PEPPERELL	SPRING	BELMONT SPRINGS WATER (1 AND 5 GAL), NEMASKET SPRING WATER
WEST LYNN CREAMERY LYNN, MA	MIDDLETON	SPRING (PARADISE	CRYSTAL CLEAR, POLAR ARCTIC (SOLD BY POLAR CORP.)
SPRING HILL DAIRY HAVERHILL, MA	HAVERHILL (AT PLANT)	WELL	SPRING HILL FARMS
GUELI SPRING WATER METHUEN, MA	METHUEN (AT PLANT)	WELL	GUELI SPRING WATER
POCAHONTAS SPRING WATER COMPANY LYNNFIELD, MA	LYNNFIELD (AT PLANT)	SPRING	POCAHONTAS SPRING WATER
A-1 SPRING WATER COMPANY IPSWICH, MA	IPSWICH (AT PLANT	WELL	A-1 SPRING WATER

RAVENWOOD SPRING WATER COMPANY GLOUCESTER, MA	GLOUCESTER (AT PLANT)	SPRING	RAVENWOOD
CUMBERLAND FARMS CANTON, MA	MENDEN (MISCOE SPRINGS)	SPRING	CLOVERFIELD DAIRY
CHARLES COPELAND COMPANY MILTON, MA	MILTON (AT PLANT)	WELL	(ONLY VENDED WATER)
ROWLEY SPRING WATER COMPANY ROWLEY, MA	ROWLEY (AT HOUSE)	SPRING	ROWLEY SPRING WATER
SAUGUS/CASTLE ROCK SPRINGS COMPANY SAUGUS, MA	SAUGUS (AT PLANT)	SPRING	CASTLE ROCK SPRING WATER
NEW ENGLAND SPRING WATER COMPANY (BOSTON WATER COOLER COMPANY) NORTH READING, MA	NORTH READING (AT PLANT)	SPRING	BOSTON WATER COOLER, NEW ENGLAND SPRING WATER, NATURE SPRINGS, KAMAL, COFFEE WAGON
HOLYOKE DISTILLED WATER HOLYOKE, MA	HOLYOKE	MUNICIPAL	HOLYOKE DISTILLED WATER
READS DAIRY SEEKONK, MA	SEEKONK	TOWN WATER	"THIS IS YOUR USUAL PRODUCT"
BERKSHIRE SPRINGS, INC SOUTHFIELD, MA	SOUTHFIELD (AT PLANT)	SPRING	BERKSHIRE SPRING WATER, MOUNTAIN STREAM SPRING WATER, HIAWATHA SPRING WATER
POLAR CORPORATION WORCESTER, MA	WORCESTER	MUNICIPAL	POLAR PURE (PURE POLAR)
TASEMOO SPRINGS/TISBURY WATER WORKS TISBURY, MA	TISBURY (AT PLANT)	SPRING	TASEMOO SPRING WATER
CRYSTAL SPRINGS WATER COMPANY PHILLIPSTON, MA	PHILLIPSTON (AT PLANT)	SPRING	CRYSTAL SPRINGS WATER
SAND SPRINGS, INC WILLIAMSTOWN, MA	WILLIAMSTOWN (AT PLANT)	SPRING	WATERS OF SAND SPRING
COOPERS DAIRY LEICESTER, MA	LEICESTER (AT PLANT)	WELL	COOPERS HILLTOP FARM WATER
DRESSER HILL FARMS DAIRY CHARLTON, MA	CHARLTON (AT PLANT)	WELL	DRESSER HILL FARMS SPRING WATER

Appendix B

Brand Name, Bottling Company and State or Country of Origin
Out-of State and Foreign Bottled Water

CODE	BRAND NAME	BOTTLING COMPANY	STATE OR COUNTRY OF ORIGIN
50	Poland Springs National Spring Water	Poland Springs Bottled Water Co.	Poland Springs, Maine
51	Poland Springs Distilled Water	Poland Springs Bottled Water Co.	Poland Springs, Maine
52	Turner Granite State Spring Water	Turner's Dairy	Salem, New Hampshire
53	Evian Les Bains Natural Spring Water	S.A. Evian Co.	Les Bains, France
54	Perrier Natural Sparkling Mineral Water (salt free)	Perrier	Vergege, France
55	Ramlosa Sparkling Mineral Water	A.B. Ramlosa	Helsingborg, Sweden
56	Golden Harvest Sheyenne Valley Sparkling Mineral Water	Dist.: Natural Sales Co., Pittsburgh, PA.	
57	Mountain Valley Spring Water	Mountain Valley Spring Water Co.	Hot Springs, Arkansas
58	Glacier Valley Natural Water	Moser Farm Dairy, Inc.	Ellington, Connecticut
59	Vittel Mineral Water		Bartlett Springs, California
60	American Eagle Pure Distilled Drinking Water	Electrified Water Co.	East Orange, New Jersey
61	Deer Park Mountain Spring Water	Deer Park Spring Water Inc.	New Tripoli, Pennsylvania
62	Vermont Spring Water	Idlenot Farm Dairy	North Springfield, Vermont
63	Naya Spring Water	Nora Beverages, Inc.	Montreal, Canada
64	Vichy Natural Alkaline Mineral Water	Compagnie Fermiere de Vichy	Vichy, France
65	Peter's Valley Natural Sparkling Mineral Water	Dist.: Frederick Import Corp. Bronxville, NY	West Germany
66	Crystal Geyser Sparkling Mineral Water	Crystal Geyser	Napa Valley, California

CODE	BRAND NAME	BOTTLING COMPANY	STATE OR COUNTRY OF ORIGIN
67	Swiss Altima Naturally Sparkling Mineral Water	Dist.: Edelweiss Inc., Kansas	Passuger Heilquellant Rhazuns, Switzerland
68	New York Seltzer Water, Original (orange flavored)	various locations	Walnut, California
69	Canada Dry Seltzer Sparkling Water (lemon lime)	Canada Dry Corp. Atlanta, Georgia	
70	St. Laurent Sparkling Natural Spring Water	Le Prieure de Rochemare	Le Teil d'Ardeche, France
71	A Sante Sparkling Mineral Water	Anheuser-Busch Bev. Co.	Santa Rosa, California
72	San Pellegrino Sparkling Mineral Water	San Pellegrino, S.P.A.	Milan, Italy
73	Adirondack Salt Free Seltzer	Adirondack Beverage Co.	Scotia, New York
74	Saint Justin Carbonated Natural Mineral Water		Spring of St. Justine Montreal, Quebec, Canada
75	Snapple Seltzer Sparkling Water	Dist.: Snapple Juice Co., Ridgewood, New York	
76	Ice Mountain Natural Spring Water	Great Spring Water of America	Rumford, Maine
77	Schweppes Sodium Free Seltzer	Schweppes, Inc.	Stamford, Connecticut
78	Apollinaris Natural Sparkling Mineral Water	Brunner A.C.	Ahrweiler, Rhineland, Germany
79	Contrexeville Natural Mineral Water	Societe Generale DeGrandes	Vasques, France
80	Badoit Sparkling Mineral Water	S.A. Des Eous	St. Gaimer, France
81	Saratoga Naturally Sparkling Mineral Water	Anheuser-Busch Beverage Group St. Louis, MO	
82	Volvic Natural Spring Water	Ste Volvic, at Volvic	Puy de Dome, France

B-2

CODE	BRAND NAME	BOTTLING COMPANY	STATE OR COUNTRY OF ORIGIN
83	Staff Tonic Water with Quinine	Dist. by: Staff Supermarkets, Norcross, Georgia	
84	SoHo Sparkling Water	American Natural Beverage Corp., Brooklyn, New York	

Appendix C

Priority Pollutants and Hazardous Substances Analyzed

US ENVIRONMENTAL PROTECTION AGENCY
REGION I LABORATORY
GC/MS PURGEABLE ORGANIC ANALYSIS - WATER

Compound	Detection Limit (ug/l)
Priority Pollutants	
Chloromethane	13
Bromomethane	3
Vinyl Chloride	4
Chloroethane	2
Methylene Chloride	1
Trichlorofluoromethane	2
1,1-Dichloroethylene	2
1,1-Dichloroethane	1
1,2,-Dichloroethylene isomers	2
Chloroform	1
1,2-Dichloroethane	1
1,1,1-Trichloroethane	1
Carbon Tetrachloride	1
Bromodichloromethane	2
1,2-Dichloropropane	1
t-1,3-Dichloropropene	1
Trichloroethylene	1
Dibromochloromethane	2
c-1,3-Dichloropropene	1
1,1,2-Trichloroethane	1
Benzene	1
2-Chloroethylvinyl ether	15
Bromoform	1
Tetrachloroethylene	1
1,1,2,2-Tetrachloroethane	1
Toluene	1
Chlorobenzene	1
Ethylbenzene	1
Acrolein	50
Acrylonitrile	20
Dichlorobenzene isomers	2
Hazardous Substances	
Acetone	43
Carbon Disulfide	4
2-Butanone	24
Vinyl Acetate	9
2-Hexanone	5
4-Methyl-2-Pentanone	3
Styrene	1
Xylenes (total)	2
1,2-Dibromoethane (EDB)	1

Other Compounds Tentatively Identified

Other Compounds Quantitated

Sample Recoveries for Surrogate Compounds:	95%Confidence Limits
1,2-Dichloroethane,d4	78-113
Benzene,d6	89-123
Toluene,d8	91-106
1,4-Bromofluorobenzene	90-109

Notes:

ND=none detected
˜=approximate
<=less than
>=greater than

Appendix D –

INSTATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

	PLANT CODE	SAMPLE DATE	TOTAL COLIFORMS/ml 100cc	SPC/ml	LEAD µg/l	ARSENIC µg/l	IRON µg/l	COPPER µg/l	MANGANESE µg/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE µg/l	BUTANE µg/l	CHLOROFORM µg/l	BROMODICHLORO-METHANE µg/l	DIBROMOCHLORO-METHANE µg/l	BROMOFORM µg/l	GROSS ALPHA* pCi/l	GROSS BETA* pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)		100				< 5.0**	< 50
	2	10/15/86	<1	~26,000	2	<2	<100	<10	<10	15	3.1	0.10	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	2.3±4.3
	2	3/09/87	<1	<1																
	3	10/15/86	<1	1,200	2	<2	<100	10	<10	7	<0.1	0.53	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	5.0±3.1
	3	3/09/87	<1	42																
	4	10/15/86	<1	11	4	<2	<100	210	<10	13	3.1	0.08	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	1.7±1.2
	5	10/15/86	<1	2,300	<2	<2	<100	10	570	6	0.36	0.24	N.D.	89	N.D.	N.D.	N.D.	N.D.	N.D.A.	2.4±1.6
	5	3/09/87	<1	<1																
	6	10/14/86	<1	<1	6	<2	<100	<10	<10	12	4.75	0.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	8.4±3.4
	7	10/14/86	<1	80	<2	19	<100	<10	30	24	<0.05	0.61	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	5.0±4.3
	8	10/15/86	<1	910	3	<2	100	<10	30	20	<0.05	0.26	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	8	3/09/87	<1	120																
	9	10/15/86	<1	<1	3	<2	<100	30	<10	8	1.25	0.08	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	10	10/15/86	<1	1	<2	<2	<100	<10	<10	8	1.90	0.04	N.D.	N.D.	<1	N.D.	N.D.	N.D.	36.5±4.1	N.D.A.
	10	10/15/86^																	N.D.A.	N.D.A.
	10	4/17/87																	N.D.A.	N.D.A.
	11	10/15/86	<1	<1	2	5	<100	80	<10	4	<0.05	0.08	1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	1.8±1.5

Key:
< less than
≈ approximate due to high level
≡ identical to
^ same sample, realiquoted
~ estimated
µg/l = microgram/liter
mg/l = milligram/liter
pCi/l = picoCuries/liter
MCL = maximum contaminant level
SPC/ml = standard plate count/milliliter
N.D. = Non Detectable
N.D.A. ≡ No Detectable Activity
* Concentration ±2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l)
** if due to radium 226 and/or radium 228. < 15 pCi/l excluding radon, uranium

JULY, 1987

INSTATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

	PLANT CODE	SAMPLE DATE	TOTAL COLIFORMS/ml 100	SPC/ml	LEAD µg/l	ARSENIC µg/l	IRON µg/l	COPPER µg/l	MANGANESE µg/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE µg/l	BUTANE µg/l	CHLOROFORM µg/l	BROMODICHLORO-METHANE µg/l	DIBROMOCHLORO-METHANE µg/l	BROMOFORM µg/l	GROSS ALPHA* pCi/l	GROSS BETA* pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)		100				< 5.0**	< 50
	12	10/15/86	<1	1	<2	<2	<100	<10	<10	14	2.91	0.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	13	12/01/86	<1	7	<2	4	100	<10	80	12	0.15	0.18	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	3.1±2.4
	14	12/01/86	<1	680	<2	11	<100	<10	90	13	<0.05	0.15	N.D.	N.D.	2	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	14	3/09/87	<1	22																
	15	12/03/86	<1	34	<2	<1	<100	10	<10	20	4.12	0.04	N.D.	N.D.	1	N.D.	N.D.	N.D.	N.D.A.	4.0±3.3
	16	12/03/86	<1	24	<2	7	<100	10	<10	40	1.37	0.15	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	1.6±3.2
	17	12/03/86	<1	26	11	<1	<100	120	<10	8	<0.05	0.22	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	1.1±1.4
	18	12/01/86	<1	<1	<2	<1	<100	<10	<10	10	0.12	0.74	N.D.	N.D.	2	N.D.	N.D.	N.D.	N.D.A.	3.6±2.4
	19	12/01/86	<1	4	<2	<1	<100	10	<10	13	1.11	0.30	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	20	12/03/86	<1	92	<2	1	<100	10	<10	8	<0.05	0.16	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	1.7±3.2
	21	12/03/86	<1	100	4	<1	<100	40	<10	<1	<0.05	0.03	N.D.	N.D.	<1	N.D.	N.D.	N.D.	N.D.A.	1.1±1.0
	22	12/03/86	<1	240	4	5	200	20	120	11	0.22	0.14	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	430±10.0	26.0±9.8
	22	4/17/87																	420±9.8	N.D.A.
	22	6/01/87																	392±10.0	N.D.A.
	22	6/01/87																	412±10.0	N.D.A.
	22	6/01/87																	371±9.5	N.D.A.

Key:

< less than
≈ approximate due to high level
≡ identical to

˙ same sample, realiquoted
˝ estimated

µg/l = microgram/liter
mg/l = milligram/liter
pCi/l = picoCuries/liter

MCL = maximum contaminant level
SPC/ml = standard plate count/milliliter
N.D. = Non Detectable
N.D.A. ≡ No Detectable Activity

* Concentration ±2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l)

** if due to radium 226 and/or radium 228.
< 15 pCi/l excluding radon, uranium

D.2

JULY, 1987

INSTATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

	PLANT CODE	SAMPLE DATE	TOTAL COLIFORMS/100ml	SPC/ml	LEAD µg/l	ARSENIC µg/l	IRON µg/l	COPPER µg/l	MANGANESE µg/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE µg/l	BUTANE µg/l	CHLOROFORM µg/l	BROMODICHLORO-METHANE µg/l	DIBROMOCHLORO-METHANE µg/l	BROMOFORM µg/l	GROSS ALPHA* pCi/l	GROSS BETA* pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)		100				< 5.0**	< 50
	22	7/02/87																	55.4±1.9	17.9±3.2
	22	7/02/87																	57.0±2.4	9.7±3.5
	23	1/21/87	<1	<1	100	<2	<100	<10	<10	1	0.05	0.34	N.D.	N.D.	19	2	N.D.	N.D.	N.D.A.	N.D.A.
	23	3/30/87			<2															
	24	1/22/87	1	1,900	<2	<2	<100	10	<10	12	1.00	0.65	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	24	3/09/87	<1	8																
	25	1/12/87	<1	39	<2	<2	<100	<10	<10	1	0.05	0.04	2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	26	1/21/87	<1	2	<2	<2	<100	<10	<10	6	0.19	0.06	N.D.	N.D.	≈110	4	N.D.	N.D.	N.D.A.	2.3±2.4
	26	2/27/87													110	N.D.	N.D.	N.D.		
	26	4/16/87													5	N.D.	N.D.	N.D.		
	27	1/20/87	<1	28	<2	<2	<100	10	<10	9	0.44	0.04	N.D.	N.D.	2	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	28	1/21/87	<1	<1	5	<2	<100	<10	<10	2	0.23	0.22	N.D.	N.D.	<1	N.D.	N.D.	N.D.	N.D.A.	1.7±1.2
	29	1/20/87	<1	<1	<2	<2	<100	<10	<10	2	0.10	0.09	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	30	4/16/87	<1	230	<2	<5	<100	<10	<10	20	0.17	0.83	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	4.0±1.2	3.2±3.0
	31	4/16/87	<1	7	<2	<5	<100	90	60	14	0.58	0.24	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	3.5±1.3	6.3±3.2
	22	9/21/81																	3.1±0.8	2.9±1.0

Key:

< less than
≈ approximate due to high level
≡ identical to

˙ same sample, realiquoted
˜ estimated

µg/l = microgram/liter
mg/l = milligram/liter
pCi/l = picoCuries/liter

MCL = maximum contaminant level
SPC/ml = standard plate count/milliliter
N.D. = Non Detectable
N.D.A. ≡ No Detectable Activity

* Concentration ±2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l)

** if due to radium 226 and/or radium 228.
< 15 pCi/l excluding radon, uranium

OUT-OF-STATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

Appendix E

	PLANT CODE	SAMPLE DATE	TOTAL COLI-FORMS/100ml	SPC/ml	LEAD ug/l	ARSENIC ug/l	IRON ug/l	COPPER ug/l	MANGANESE ug/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE ug/l	ACETONE ug/l	CHLOROFORM ug/l	BROMODICHLORO-METHANE ug/l	DIBROMOCHLORO-METHANE ug/l	BROMOFORM ug/l	METHYLENE CHLOR-IDE• ug/l	1,1,1-TRICHLORO-ETHANE ug/l	TRICHLORO-ETHYLENE ug/l	TRICHLOROTRI-FLUOROETHANE ug/l	ETHANOL ug/l	GROSS ALPHA• pCi/l	GROSS BETA• pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)				100			200	5			<5**	<50
	50	5/21/87	<1	<1	N.D.	2	N.D.	N.D.	<1	2	-	N.D.	N.D.	N.D.	1.3	N.D.	N.D.	N.D.	N.D.	2.7	<1	N.D.	N.D.	N.D.A.	N.D.A.
	51	5/21/87	<1	<1	N.D.	N.D.	N.D.	N.D.	<1	N.D.	-	N.D.	<1	N.D.	1.6	N.D.	N.D.	N.D.	N.D.	30	N.D.	N.D.	+	N.D.A.	N.D.A.
	52	5/21/87	<1	2	N.D.	8	N.D.	N.D.	12	10	-	0.3	N.D.	N.D.	2.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.1 ± 1.1	4.6 ± 2.1
	53	5/21/87	<1	<1	N.D.	4	N.D.	N.D.	N.D.	5	-	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	54	6/12/87	<1	<1	N.D.	1	N.D.	N.D.	<1	16	-	0.15	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.1 ± 1.4	N.D.A.
	55	6/15/87	<1	<1	N.D.	N.D.	N.D.	N.D.	N.D.	220	0.1	<0.5	<1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2.4 ± 1.6	4.3 ± 5.3
	56	5/21/87	<1	<1	N.D.	2	100	N.D.	2	225	-	0.8	N.D.	110	14	11	4.1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	4.6 ± 5.3
	57	6/15/87	<1	<1	N.D.	N.D.	N.D.	N.D.	N.D.	3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	58	5/19/87	<1	<1	1	N.D.	<50	N.D.	39	10	-	0.2	N.D.	N.D.	1.6	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	59	6/15/87	<1	3,200	N.D.	39	N.D.	N.D.	20	12	0.05	<.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	1.6 ± 0.9	N.D.A.
	60	7/08/87	<1	<1	N.D.	4	N.D.	N.D.	N.D.	<0.1	0.3	N.D.	<1	N.D.	2.1	N.D.	N.D.	N.D.	N.D.	<1	N.D.	2.7	N.D.	N.D.A.	N.D.A.
	61	7/08/87	<1	<1	N.D.	3	<100	N.D.	N.D.	0.8	0.3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	62	6/1/87	<1	<1	N.D.	<2	N.D.	N.D.	<1	4.5	<0.2	0.25	N.D.	N.D.	6.8	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	3.0 ± 2.7
	63	5/22/87	<1	8	N.D.	3	N.D.	N.D.	43	5	-	0.2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	10.4 ± 1.2	3.5 ± 2.8
	64	6/22/87	<1	<1	N.D.	12	100	N.D.	<5	1110	0.7	6.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	23.6 ± 4.2	77.8 ± 12.
	65	6/15/87	<1	2	N.D.	17	N.D.	N.D.	600	140	0.1	<0.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	12.4 ± 2.1	13.2 ± 5.
	66	7/13/87	<1	<1	N.D.	18	N.D.	N.D.	5	140	1.0	8.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	N.D.A.	19.5 ± 5.

KEY:
< less than
- not analyzed
+ present
ε several unidentified compounds
Φ unable to analyze due to chemical interference
• Methylene chloride = dichloromethane
• Concentration ± 2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l for Alpha and 3 pCi/l for Beta radiation)
•• if due to radium 226 and/or radium 228. < 15 pCi/l excluding radon, uranium.
* sample 84 also positive for xylenes (3ug/l) and ethylbenzene (<1ug/l)

MCL = maximum contaminent level
SPC/ml = standard plate count/milliliter
N.D. = Non Detectable
N.D.A. = No Detectable Activity

ug/l = microgram/liter
mg/l = milligram/liter
pCi/l = picoCuries/liter

OUT-OF-STATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

	PLANT CODE	SAMPLE DATE	TOTAL COLI-FORMS/100ml	SPC/ml	LEAD ug/l	ARSENIC ug/l	IRON ug/l	COPPER ug/l	MANGANESE ug/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE ug/l	ACETONE ug/l	CHLOROFORM ug/l	BROMODICHLORO-METHANE ug/l	DIBROMOCHLORO-METHANE ug/l	BROMOFORM ug/l	METHYLENE CHLOR-IDE* ug/l	1,1,1-TRICHLORO-ETHANE ug/l	TRICHLORO-ETHYLENE ug/l	TRICHLOROTRI-FLUOROETHANE ug/l	ETHANOL ug/l	GROSS ALPHA* pCi/l	GROSS BETA* pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)				100			200	5			<5**	<50
	67	7/13/87	<1	350	N.D.	7	N.D.	N.D.	400	70	0.3	0.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	9.0±2.9	14.9±10.0
	68	7/30/87	<1	<1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	Φ	0.2	N.D.	630	<1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	Φ	Φ
	69	7/17/87	<1	<10	N.D.	3	<100	N.D.	N.D.	9	1.0	0.7	N.D.	N.D.	54	2.4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+,ε	N.D.A.	N.D.A.
	70	5/21/87	<1	<1	N.D.	4	N.D.	N.D.	<1	3	-	0.1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	71	7/23/87	<1	2	N.D.	115	N.D	N.D.	N.D.	220	1.6	1.05	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	N.D.A.	7.9 ± 2.8
	72	8/3/87	<1	<1	N.D.	1	N.D.	N.D.	<1	65	0.45	0.9	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	28.2 ± 1.8	11.1 ± 5.
	73	7/23/87	<1	<1	N.D.	N.D.	N.D.	N.D.	N.D.	24	1.0	<0.3	N.D.	N.D.	4.7	1.3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	74	6/12/87	<1	<1	N.D.	N.D.	N.D.	100	1	300	0.8	5.0	<1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.4 ± 1.4	6.1 ± 5.0
	75	6/12/87	<1	<1	N.D.	<2	N.D.	N.D.	N.D.	7	<0.2	1.1	N.D.	42	8.5	N.D.	N.D.	N.D.	1.2	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	76	7/17/87	<1	<1	N.D.	4	<100	N.D.	N.D.	1.1	0.3	<0.2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	77	7/23/87	<1	<1	N.D.	N.D.	N.D.	N.D.	N.D.	18	0.60	<0.3	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	Φ	Φ
	78	8/3/87	<1	<1	N.D.	13	N.D.	N.D.	10	450	2.9	0.7	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	7.2±2.7	22.5±21.2
	79	8/3/87	<1	4	N.D.	<1	N.D.	N.D.	N.D.	8	0.7	0.4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	6.8 ± 11.
	80	8/3/87	<1	<1	N.D.	N.D.	N.D.	N.D.	900	140	5.0	1.7	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	78.4±5.5	15.0±11.4
	81	8/3/87	<1	10	N.D.	N.D.	N.D.	N.D.	7	28	1.6	<0.2	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.1 ± 1.0	N.D.A.

KEY:
< less than
− not analyzed
+ present
ε several unidentified compounds
Φ unable to analyze due to chemical interference
* Methylene chloride = dichloromethane
* Concentration ± 2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l for Alpha and 3 pCi/l for Beta radiation)
** If due to radium 226 and/or radium 228.
< 15 pCi/l excluding radon, uranium.
* sample 84 also positive for xylenes (3ug/l) and ethylbenzene (<1ug/l)

MCL = maximum contaminent level
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N.D. = Non Detectable
N.D.A. = No Detectable Activity

ug/l = microgram/liter
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OUT-OF-STATE BOTTLED WATER
SUMMARY OF POSITIVE RESULTS

	PLANT CODE	SAMPLE DATE	TOTAL COLI-FORMS/100ml	SPC/ml	LEAD ug/l	ARSENIC ug/l	IRON ug/l	COPPER ug/l	MANGANESE ug/l	SODIUM mg/l	NITRATE mg/l	FLOURIDE mg/l	TOLUENE ug/l	ACETONE ug/l	CHLOROFORM ug/l	BROMODICHLORO-METHANE ug/l	DIBROMOCHLORO-METHANE ug/l	BROMOFORM ug/l	METHYLENE CHLOR-IDE* ug/l	1,1,1-TRICHLORO-ETHANE ug/l	TRICHLORO-ETHYLENE ug/l	TRICHLOROTRI-FLUOROETHANE ug/l	ETHANOL ug/l	GROSS ALPHA* pCi/l	GROSS BETA* pCi/l
MCL OR (GUIDELINE)			<1	(500)	50	50	300	1000	50	(20)	10.0	1.0 -2.4	(50)				100			200	5			<5**	<50
	82	8/3/87	<1	<1	N.D.	14	N.D.	N.D.	N.D.	20	1.4	0.4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.
	83	7/30/87	<1	<1	N.D.	N.D.	100	N.D.	2	11	●	0.1	N.D.	3000	7.7	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	+	●	●
	84²	11/24/87	<1	6	18	N.D.	<100	0.5	11	10	0.4	-	14	N.D.	3.9	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.A.	N.D.A.

336-1

KEY:
- < less than
- − not analyzed
- + present
- ε several unidentified compounds
- Φ unable to analyze due to chemical interference
- * Methylene chloride = dichloromethane
- * Concentration ± 2 standard deviations (95% confidence limits) (minimum detectable activity is 1 pCi/l for Alpha and 3 pCi/l for Beta radiation)
- ** if due to radium 226 and/or radium 228.
  < 15 pCi/l excluding radon, uranium.
- ² sample 84 also positive for xylenes (3ug/l) and ethylbenzene (<1ug/l)

MCL = maximum contaminent level
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